

# COMBINER 160 12 Volt Model C160 FOR ALTERNATORS UP TO 200 AMPS.

## SUMMARY

The Combiner 160 is a precision voltage-sensing relay (13.0 volts) which connects two batteries together when either is receiving a charge. When the charging ceases, it disconnects so that each battery operates independently and prevents accidental discharge of the starting battery. Supplemental battery banks can be added by using an additional Combiner for each bank. It eliminates manual switching every time you start the engine to parallel batteries for charging. Never again forget to switch it back. No diodes so no voltage drop, and batteries get a full charge.

## FEATURES

Suitable for alternators up to 200 amps, up to 18 volts.  
160 amps continuous rating, 400 amps closing current,  
Nearly UNLIMITED warranty\*  
Waterproof  
Ignition rated for explosive atmospheres  
No voltage drop so batteries reach full charge  
Electronic thermal monitoring with shutdown & restart  
Minimal wasted power, no heat sink or cooling required  
Can be used on alternators with internal regulators  
Protects alternator against overload from low batteries  
No special wiring for alternators with external sense  
Simple basic installation, two battery wires and ground  
Comes with 6 gauge crimp terminals  
**Green LED** indicates when combined  
**Red LED** indicates thermal overload or low voltage.  
Draws no current when batteries are not being charged  
Draws 1/4 amp from the alternator when charging is in progress  
No diodes to burn out if accidentally shorted  
Optional external remote for **off, automatic, on**  
Remote "ON" can be used for assisted engine starting  
Withstands ambient temperature to over 175 F (80 C) for exposed or engine compartment mounting

## SAFETY CONSIDERATIONS

**DANGER:** On all alternator/regulator circuits with an external sense wire it is critical that the sense wire can never be disconnected from the alternator output.

**WARNING:** If there are switches which can disconnect the alternator output from the battery this should be avoided when the engine is running.

Since the connections made in the battery circuits can carry hundreds of amps, it is imperative that you have low

resistance connections. This means having clean metal to metal contact, the right size ring terminals, properly crimped terminals, and secure mechanical fastenings.

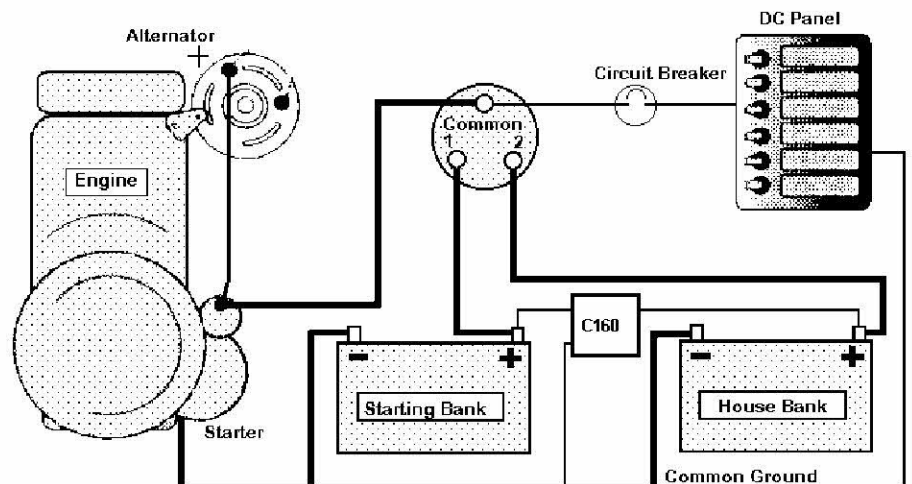
## BASIC INSTALLATION

1. Connect the **BLACK** ground wire to either battery negative or any convenient negative terminal block.
2. Connect two 6 gauge or smaller **RED** cables to the positive terminals of the batteries. **Use a MINIMUM of 6 feet. 3+3, 5+1, any combination.** Longer is OK. Gauge heavier than 6 can be used on runs over 12 feet.

The connections do not have to be made right on the battery terminals but any wire or cables between the battery and the combiner must be heavy enough to carry the combiner current in addition to any existing loads. Make sure the second red lead is not touching ground when you connect the first since the Combiner sometimes closes momentarily when initially connected.

2. That completes the basic installation. Any other wires are not normally used and should be secured and the ends insulated. See Appendix

## SAMPLE INSTALLATION INSTRUCTIONS



### 1. Single engine powerboats:

With the Combiner 160 you can use an (optional) **OFF-1-BOTH-2** switch to select the engine power source and leave the DC loads permanently on battery 2. Starting power is normally supplied from the starting battery in position 1 but battery 2 or both can be selected in an emergency. In all cases, both batteries are being charged when the engine is running.

**WARNING:** If you use this circuit, turning the switch to "OFF" while the engine is running may damage your alternator. If not using a switch, the motor connects directly to the starting battery.

